

Response Under 37 C.F.R. § 1.116

Applicant: E. Scott Hagermoser et al.

Serial No.: 10/658,490

Filed: September 8, 2003

Docket No.: 59004US002

Title: VEHICLE TOUCH INPUT DEVICE AND METHODS OF MAKING SAME

Listing of Claims

1. (Original) A touch input device for interacting with electronic systems in a vehicle that includes an airbag, comprising:
 - an airbag cover having a surface accessible to and touchable by an occupant of the vehicle; and
 - a capacitive touch sensor disposed between the airbag and the airbag cover, the touch sensor configured so that a touch to a designated area of the surface of the airbag cover allows capacitive coupling between the touch and the touch sensor through the airbag cover, the touch sensor adapted for connecting to a controller capable of using signals generated by the capacitive coupling to interact with electronic systems of the vehicle.

2. (Original) The touch input device of claim 1, wherein the vehicle is an automobile.

3. (Original) The touch input device of claim 1, wherein the surface of the airbag cover comprises a relief pattern marking the designated area.

4. (Original) The touch input device of claim 1, wherein the airbag cover is on a steering wheel.

5. (Original) The touch input device of claim 4, wherein the steering wheel incorporates additional touch sensors.

6. (Original) The touch input device of claim 1, wherein the airbag cover is on a passenger side of the vehicle.

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7. (Original) The touch input device of claim 1, further comprising one or more additional capacitive touch sensors positioned between the airbag and the airbag cover.

8. (Original) The touch input device of claim 1, wherein the capacitive touch sensor is configured to safely blow apart upon deployment of the airbag.

9. (Original) The touch input device of claim 1, wherein the capacitive touch sensor is an x-y sensor.

10. (Original) The touch input device of claim 1, wherein the capacitive touch sensor is a quadrant segmented sensor.

11. (Original) The touch input device of claim 1, wherein the capacitive touch sensor is a scroll bar sensor.

12. (Previously Presented) The touch input device of claim 5, further comprising at least one discrete capacitive touch sensor button disposed within a spoke of the steering wheel.

13. (Original) The touch input device of claim 1, wherein the capacitive touch sensor comprises a substrate comprising paper.

14. (Original) The touch input device of claim 1, wherein the capacitive touch sensor comprises a substrate comprising cloth.

15. (Original) The touch input device of claim 1, wherein the capacitive touch sensor comprises a substrate comprising plastic.

16. (Original) The touch input device of claim 1, wherein the airbag cover provides a substrate for the capacitive touch sensor.

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17. (Original) The touch input device of claim 1, wherein the electronics systems include radio controls.

18. (Original) The touch input device of claim 1, wherein the electronics systems include an electronic display.

19. (Original) The touch input device of claim 18, wherein the electronic display is a heads up display.

20. (Original) The touch input device of claim 1, wherein the electronics systems include a heating/cooling/blower system.

21. (Original) The touch input device of claim 1, wherein the electronics systems include a navigational system.

22. (Original) The touch input device of claim 1, wherein the electronics systems include a hands-free phone.

23. (Original) A method of making a touch-enabled airbag cover, comprising:
providing an airbag cover configured for enclosing an airbag in a vehicle and for providing a finished surface; and
disposing a capacitive touch sensor on a back surface of the airbag cover opposing the finished surface, the touch sensor configured so that a touch to a designated area of the finished surface allows capacitive coupling between the touch and the touch sensor through the airbag cover, the touch sensor adapted for connecting to a controller capable of using signals generated by the capacitive coupling to interact with electronic systems of the vehicle.

24. (Original) The method of claim 23, wherein the step of disposing a capacitive

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touch sensor on the back surface of the airbag cover comprises transferring conductors forming the touch sensor from a decal layer to the back surface of the airbag cover.

25. (Original) The method of claim 23, wherein the step of disposing a capacitive touch sensor on the back surface of the airbag cover comprises laminating the touch sensor to the back surface of the airbag cover.

26. (Previously Presented) The method of claim 23, wherein the step of disposing a capacitive touch sensor on the back surface of the airbag cover comprises disposing the touch sensor in a mold and molding the airbag cover using the mold so that the touch sensor is embedded in the back surface of the airbag cover.

27. (Original) The method of claim 23, further comprising marking the designated area with a relief pattern that can be discerned by a user's tactile senses.

28. (Original) A touch input device for interacting with electronic systems in a vehicle, comprising:

a capacitive touch sensor disposed behind a surface in the vehicle that is accessible and touchable by an occupant in the vehicle, the touch sensor disposed in a manner such that the presence of the touch sensor maintains the look, feel, and functionality of the surface as if the touch sensor was excluded,

wherein the touch sensor is configured so that a touch to a designated area of the surface allows capacitive coupling between the touch and the touch sensor through the surface, the touch sensor being adapted for connecting to a controller capable of using signals generated by the capacitive coupling to interact with electronic systems of the vehicle.

29. (Original) The touch input device of claim 28, wherein the surface is a surface of a steering wheel.

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30. (Original) The touch input device of claim 28, wherein the surface is a surface of a dashboard.

31. (Original) The touch input device of claim 28, wherein the surface is a surface of a visor.

32. (Original) The touch input device of claim 28, wherein the surface is a surface of a center console.

33. (Original) The touch input device of claim 28, wherein the surface is a surface of an arm rest.

34. (Original) The touch input device of claim 28, wherein the surface is a surface of a seat cover.

35. (Original) The touch input device of claim 28, wherein the designated area of surface is marked by a relief pattern discernable by a user's tactile sense.

36. (Previously Presented) The touch input device of claim 1, wherein the capacitive touch sensor is an off-display capacitive touch sensor characterized by an absence of a display screen.

37. (Previously Presented) The touch input device of claim 28, wherein the surface is not a display screen.

38. (Previously Presented) The touch input device of claim 28, wherein the capacitive touch sensor comprises a projected capacitive touch sensor and the surface comprises an opaque surface.